

Claims

What is claimed is:

1. A user interface device comprising:
 - 2 a housing;
 - a freely-rotating trackball configured to be displaceable within said housing and
 - 4 responsive to pressure applied to said trackball;
 - a displacement sensor generating a sensor signal responsive to displacement of said
 - 6 trackball relative to said housing; and
 - signal circuitry producing an outgoing displacement signal responsive to said sensor
 - 8 signal.
2. The user interface device of claim 1, wherein said trackball is displaceable in
 - 2 two independent directions, wherein
 - said displacement sensor generates said sensor signal responsive to said two
 - 4 independent directions of said displacement of said trackball.
3. The user interface device of claim 1, wherein said trackball is displaceable in
 - 2 three independent directions, wherein
 - said displacement sensor generates said sensor signal responsive to said three
 - 4 independent directions of said displacement of said trackball.
4. The user interface device of claim 1, further comprising:
 - 2 a rotation sensor generating a rotation sensor signal responsive to a component of
 - rotation applied to said trackball, wherein
 - 4 said signal circuitry further producing an outgoing rotational signal responsive to said
 - rotational sensor signal.

5. The user interface device of claim 1, further comprising:
2 a rotation sensor generating a rotation sensor signal responsive to two independent
components of rotation applied to said trackball, wherein
4 said signal circuitry further producing an outgoing rotational signal responsive to said
rotational sensor signal.

6. The user interface device of claim 1, further comprising:
2 a rotation sensor generating a rotation sensor signal responsive to three independent
components of rotation applied to said trackball, wherein
4 said signal circuitry further producing an outgoing rotational signal responsive to said
rotational sensor signal.

7. The user interface device of claim 1, wherein said displacement sensor
2 comprises a variable resistive element.

8. The user interface device of claim 1, wherein said displacement sensor
2 comprises a variable capacitive element.

9. The user interface device of claim 1, wherein said displacement sensor
2 comprises an electro-magnetic element.

10. The user interface device of claim 1, wherein said displacement sensor
2 comprises an optical element.

11. The user interface device of claim 1, wherein said displacement sensor
2 comprises at least one switch.

12. The user interface device of claim 1, wherein said displacement sensor
2 comprises a pressure sensor.

13. The user interface device of claim 1, wherein said outgoing displacement
2 signal defines a click event.

14. The user interface device of claim 1, wherein said outgoing displacement
2 signal is one parameter of a widely-varying adjustable parameter.

15. A user interface device comprising:
2 a housing;
a freely-rotating trackball configured to be displaceable within said housing and
4 responsive to pressure applied to said trackball;
a rotation sensor generating a sensor signal responsive to one or more of said three
6 independent directions of rotation of said trackball; and
signal circuitry producing an outgoing rotational signal responsive to said sensor
8 signal, said outgoing rotational signal comprising three rotational component signals, each
uniquely associated with one of said three independent directions of rotation of said trackball.

16. The user interface device of claim 15, wherein each of said three independent
2 directions of rotation of said trackball respectively comprise roll, pitch, and yaw of said
trackball.

17. The user interface device of claim 15, wherein said signal circuitry comprises
2 a signal processor.

18. The user interface device of claim 15, wherein a first of said three rotation
2 component signals is generated in response to rotational roll of said trackball, a second of
said three rotation component signals is generated in response to rotational pitch of said
4 trackball, and a third of said three rotation component signals is generated in response to
rotational yaw of said trackball.

19. The user interface device of claim 15, wherein said rotation sensor comprises
2 a capacitance sensor.

20. The user interface device of claim 15, wherein said rotation sensor comprises
2 an optical sensor.

21. The user interface device of claim 15, wherein said rotation sensor comprises
2 a magnetic sensor.

22. The user interface device of claim 15, wherein said rotation sensor comprises
2 an electro-magnetic sensor.

23. The user interface device of claim 15 wherein said rotation sensor comprises
2 an acoustic sensor.

24. The user interface device of claim 15, wherein said rotation sensor detects at
2 least one resonance.

25. The user interface device of claim 15, wherein said rotation sensor detects at
2 least one polarization component.

26. The user interface device of claim 15, wherein one direction of said three
2 independent directions of rotation defines a click event.

27. The user interface device of claim 15, said housing further comprising:
2 a saddle assembly configured to be displaceable within said housing responsive to pressure applied to said trackball;
4 a displacement sensor generating a displacement sensor signal responsive to said displacement of said saddle assembly relative to said housing; and
6 said sensor signal circuitry further producing an outgoing displacement signal responsive to said displacement sensor signal.

28. The user interface device of claim 27, wherein said displacement sensor
2 comprises at least one switch.

29. The user interface device of claim 27, wherein said displacement sensor
2 comprises a pressure sensor.

30. The user interface device of claim 27, wherein said outgoing displacement
2 signal defines a click event.

31. The user interface device of claim 27, wherein said outgoing displacement
2 signal is one parameter of a widely-varying adjustable parameter.

32. The user interface device of claim 27, wherein said saddle assembly is
2 displaceable in two independent directions, wherein
said displacement sensor generates said displacement sensor signal responsive to said
4 two independent directions of said displacement of said saddle assembly.

33. The user interface device of claim 27, wherein said saddle assembly is
2 displaceable in three independent directions, wherein
said displacement sensor generates said displacement sensor signal responsive to said
4 three independent directions of said displacement of said saddle assembly.